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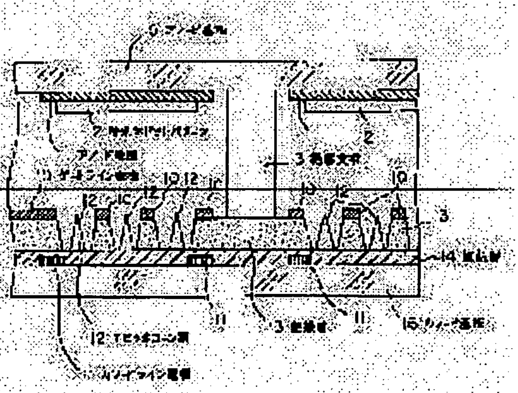
(54) **DISPLAY DEVICE**

(57)Abstract:

PURPOSE: To electrically isolate an anode electrode and a gate line electrode from each other, and prevent a short circuit between the gate line electrode and a cathode line electrode.

CONSTITUTION: A notch part is arranged on the edge of an anode electrode 1, and a notch part is also arranged on the edge of an opposed gate line electrode 10. When an insulating column 3 is arranged in these notch parts, since the anode electrode 1, the gate line electrode 10 and the insulating column 3 do not contact with each other, they can be electrically isolated from each other. A notch part is also arranged on the edge of a cathode line electrode 11 positioned just under the gate line electrode 10, and even when an insulating layer 13 is deformed by the insulating column 3, a short circuit between the gate line electrode 10 and the cathode line electrode 11 can be prevented.



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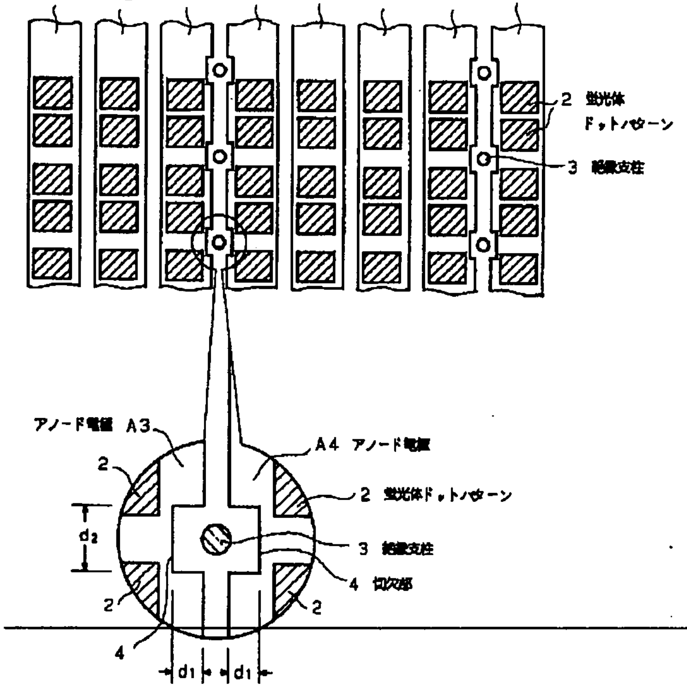
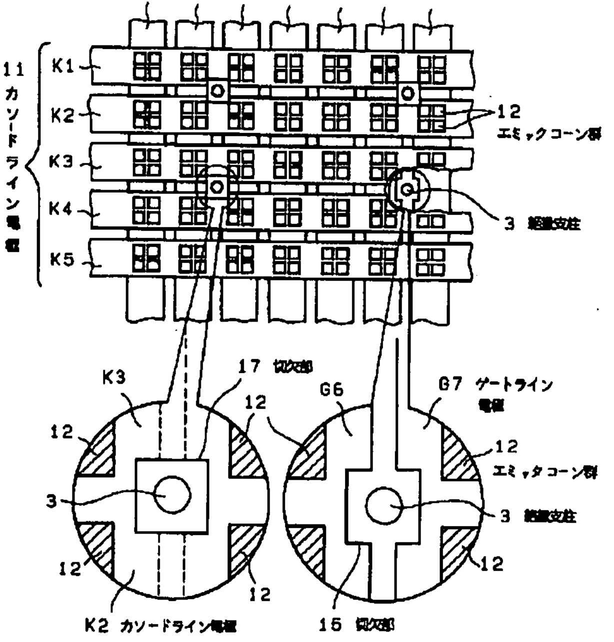
DRAWINGS

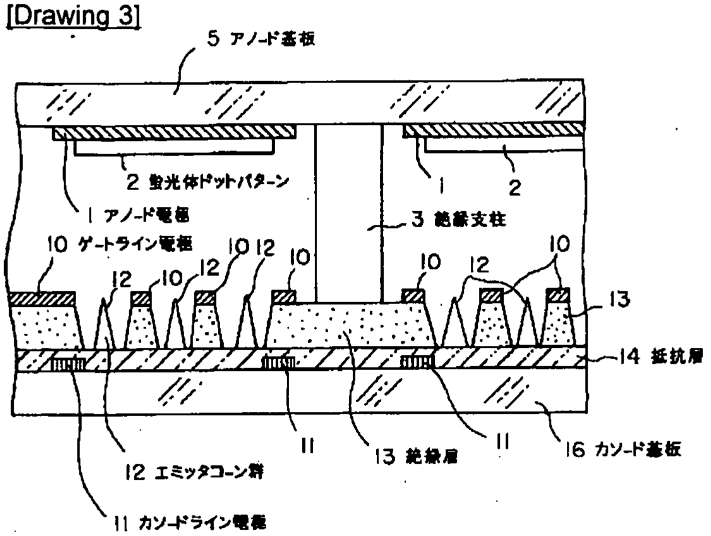
[Drawing 1]



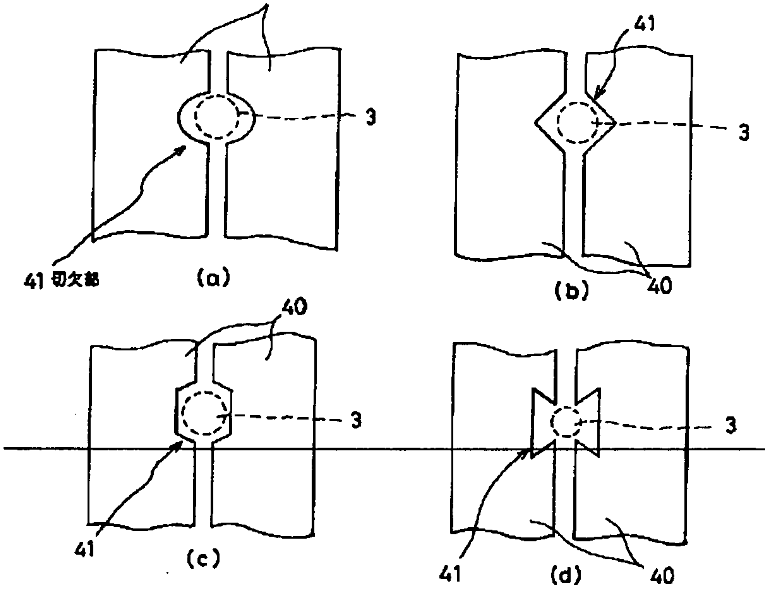
[Drawing 2]



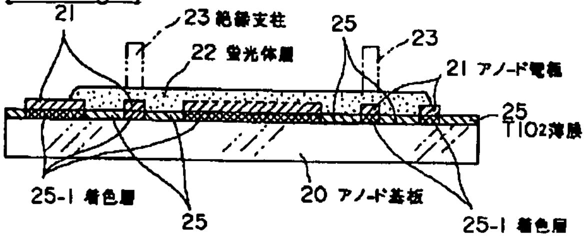
[Drawing 3]



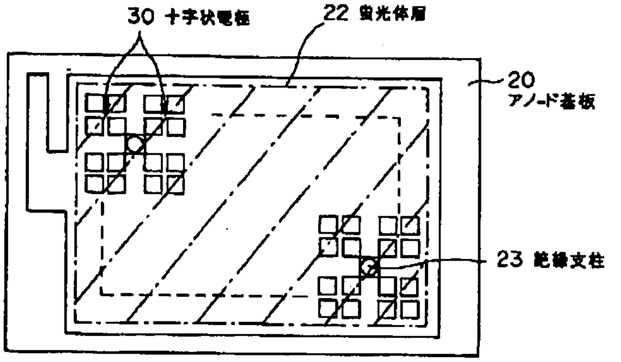
[Drawing 4]



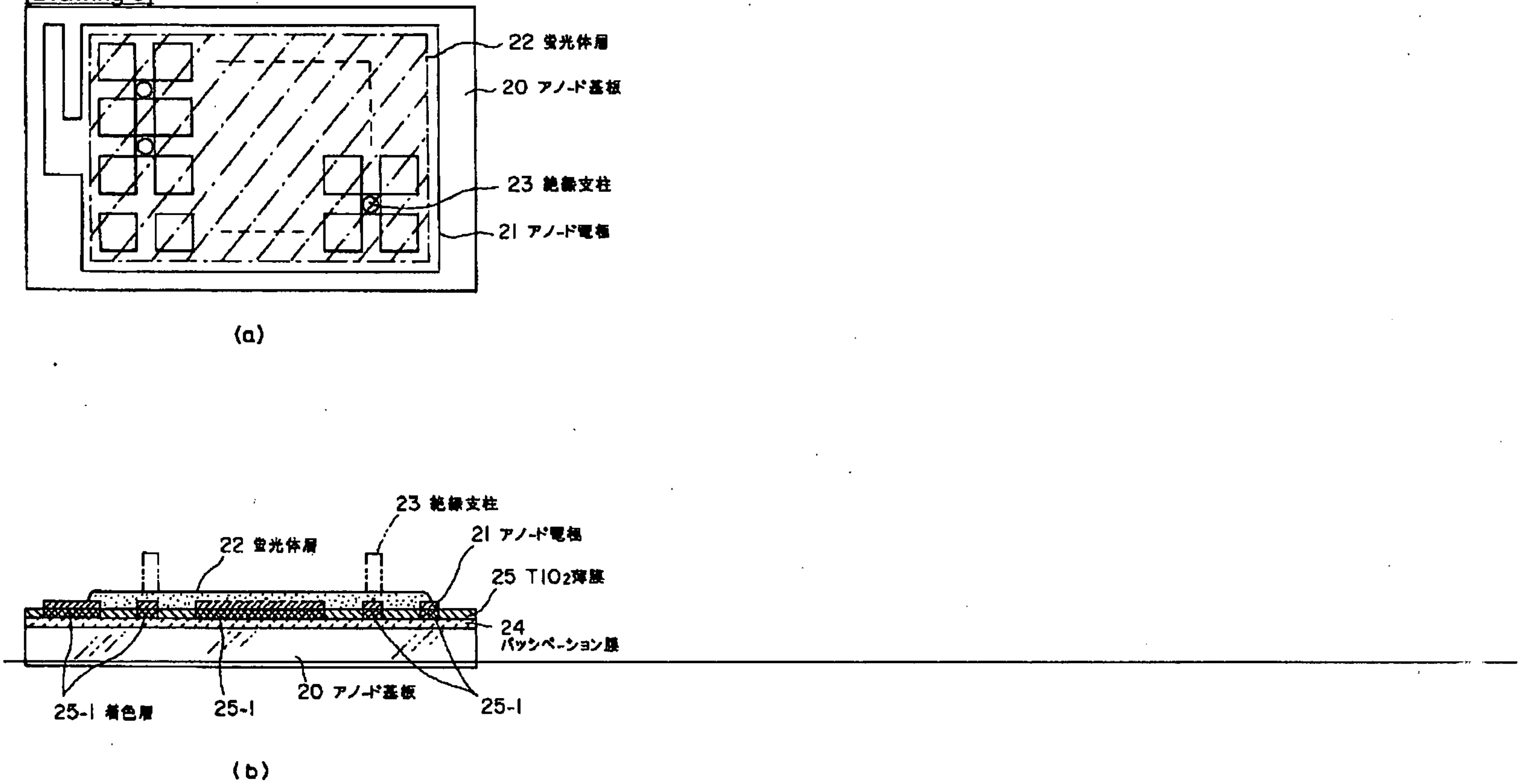
[Drawing 7]



[Drawing 8]



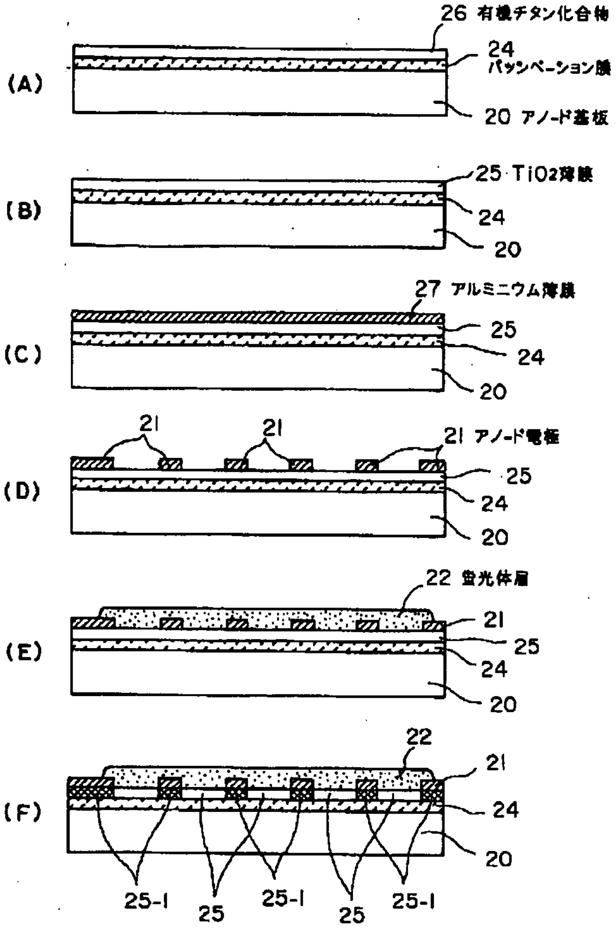
[Drawing 5]



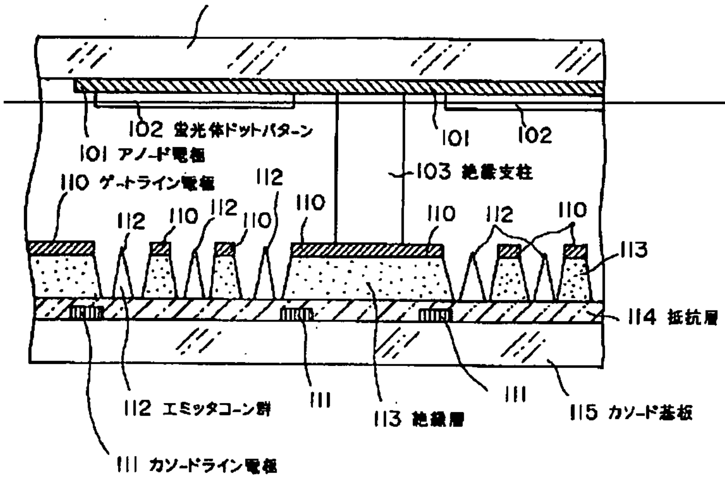
(a)

(b)

[Drawing 6]



[Drawing 9]



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PRIOR ART

[Description of the Prior Art] They are the impression electric field on a metal or the front face of a semi-conductor 109 If it is made [V/m] extent, according to the tunnel effect, an electron will pass an obstruction and electron emission will be performed into a vacuum also in ordinary temperature. Although it is the phenomenon which this phenomenon is called field emission (Field Emission), and was known for many years, the cathode which emits an electron using such a principle is called the field emission cathode (Field Emission Cathode). It is possible by attaining creation of said field emission cathode of micron size, and forming a majority of these field emission cathodes on a substrate in recent years, making full use of semi-conductor ultra-fine processing technology, to create the field emission array of a field emission mold. Applying such a field emission array as an electron source of an indicating equipment, CRT, an electron microscope, or electron beam equipment is proposed.

[0003] Although the conventional display which is an example of that example of application is shown in drawing 9 , in this display, the envelope which holds the interior to a high vacuum is formed by carrying out opposite arrangement of the glass cathode substrate 115 with which the field emission array was formed, and the transparence glass anode substrate 104 with which the fluorescent substance was formed with predetermined spacing. Let further the field emission array formed in this cathode substrate 115 be the field emission array of the Spindt (Spindt) mold constituted with the cathode line electrode 111 of the shape of a stripe formed of the spatter etc., the resistive layer 114 formed on it, the emitter cone group 112 by which two or more formation was carried out on it, and the gate line electrode 110 formed near the tip of this emitter cone group 112. In addition, the laminating of the insulating layer 113 is carried out at a resistive layer 114 top, and the gate line electrode 110 is formed on this insulating layer 113.

[0004] He can create the pitch between the emitter cones of this emitter cone group 112 with the dimension of 10 microns or less, and is trying to prepare such an emitter cone on tens of thousands thru/or several 100,000 pieces, and one cathode substrate 115. In addition, in this field emission array, since distance between gate cathodes can be made submicron, it can be small between gate cathodes, or an electron can be emitted from the emitter cone group 112 by impressing the electrical potential difference VGE of several 10 volts.

[0005] By the way, the anode electrode 101 is formed in the anode substrate 104, and on it, the fluorescent substance dot pattern 102 carries out a laminating, and is formed. Then, it is the forward electrical potential difference VA to the anode electrode 101. If ~~it is made to impress, the electron emitted from the emitter cone group 112 comes to be caught with the anode electrode 101, and~~ in order that the electron caught may collide with the fluorescent substance dot pattern 102 by which the laminating is carried out on the anode electrode 101 and may excite this at this time, the fluorescent substance dot pattern 102 will come to emit light. This luminescence is observable through the anode substrate 104 of transparence.

[0006] Furthermore, in this display, the interior of the envelope constituted by the cathode substrate 115 and the anode substrate 104 is made into a high vacuum, and since the case where the cathode substrate 115 and the anode substrate 104 cannot hold predetermined spacing under the effect of atmospheric pressure arises, the insulating stanchion 103 is arranged between the cathode substrate 115 and the anode substrate 104. This insulating stanchion 103 is formed by insulators, such as glass, and is arranged for every predetermined spacing between the cathode substrate 115 and the anode substrate 104. [two or more]

[0007] And the upper limit of the insulating stanchion 103 is arranged so that the anode electrode 101 currently formed on the anode substrate 104 may be contacted, and the lower limit of the insulating stanchion 103 is arranged so that the gate line electrode 111 formed on the insulating layer 113 in the cathode substrate 115 may be contacted.

[0008] In addition, the matrix consists of two or more cathode line electrodes 111 of the shape of a stripe formed on the cathode substrate 115, and a gate line electrode 110 of the shape of a stripe formed so that it might intersect perpendicularly with this cathode line electrode 111, and it is scanned in the cathode scan section and the gate scan section which this matrix does not illustrate. Thereby, according to a picture signal, an electron is emitted from the emitter cone group 112, the corresponding fluorescent substance dot pattern 102 comes to emit light, and an image comes to be alternatively displayed on the anode substrate 104. In this case, the picture signal is impressed to the gate scan section, and when the scan of the 1 field is completed, the image of one sheet is displayed on the anode substrate 104.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is drawing showing the configuration by the side of the anode substrate of one example of the display of this invention.
[Drawing 2] It is drawing showing the configuration by the side of the cathode substrate of one example of the display of this invention.
[Drawing 3] It is the sectional side elevation of one example of the display of this invention.
[Drawing 4] It is the modification of a notch prepared in the edge of a stripe-like electrode.
[Drawing 5] It is drawing showing the modification of the configuration by the side of the anode substrate of one example of the display of this invention.
[Drawing 6] It is drawing showing the making process of the modification shown in drawing 5 .
[Drawing 7] It is drawing showing other modifications of the configuration by the side of the anode substrate of one example of the display of this invention.
[Drawing 8] It is drawing showing the modification of further others of the configuration by the side of the anode substrate of one example of the display of this invention.
[Drawing 9] It is the sectional side elevation of the conventional display.
[Description of Notations]
1 21 Anode electrode
2 Fluorescent Substance Dot Pattern
3 23 Insulating stanchion
4, 15, 17, 41 Notch
5 20 Anode substrate
10 Gate Line Electrode
11 Cathode Line Electrode
12 Emitter Cone Group
13 Insulating Layer
14 Resistive Layer
16 Cathode Substrate
22 Fluorescent Substance Layer
24 PASSHI **-SHON Layer
25 TiO2 Layer
25-1 Coloring Layer
26 Organic Titanium Compound
27 Aluminum Thin Film
30 Cross-Joint-like Electrode
40 Stripe-like Electrode

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention is applied to the display which equips that interior especially with a field emission cathode about a display equipped with an insulating stanchion, and is suitable so that spacing of the fluorescent substance for displaying an image etc., and the anode substrate and cathode substrate which counters in the envelope for a display which contains the electron source which excites this fluorescent substance may be held at predetermined interval.
[0002]
[Description of the Prior Art] They are the impression electric field on a metal or the front face of a semi-conductor 109 If it is made [V/m] extent, according to the tunnel effect, an electron will pass an obstruction and electron emission will be performed into a vacuum also in ordinary temperature. Although it is the phenomenon which this phenomenon is called field emission (Field Emission), and was known for many years, the cathode which emits an electron using such a principle is called the field emission cathode (Field Emission Cathode). It is possible by attaining creation of said field emission cathode of micron size, and forming a majority of these field emission cathodes on a substrate in recent years, making full use of semi-conductor ultra-fine processing technology, to create the field emission array of a field emission mold. Applying such a field emission array as an electron source of an indicating equipment, CRT, an electron microscope, or electron beam equipment is proposed.
[0003] Although the conventional display which is an example of that example of application is shown in drawing 9, in this display, the envelope which holds the interior to a high vacuum is formed by carrying out opposite arrangement of the glass cathode substrate 115 with which the field emission array was formed, and the transparence glass anode substrate 104 with which the fluorescent substance was formed with predetermined spacing. Let further the field emission array formed in this cathode substrate 115 be the field emission array of the Spindt (Spindt) mold constituted with the cathode line electrode 111 of the shape of a stripe formed of the spatter etc., the resistive layer 114 formed on it, the emitter cone group 112 by which two or more formation was carried out on it, and the gate line electrode 110 formed near the tip of this emitter cone group 112. In addition, the laminating of the insulating layer 113 is carried out at a resistive layer 114 top, and the gate line electrode 110 is formed on this insulating layer 113.
[0004] He can create the pitch between the emitter cones of this emitter cone group 112 with the dimension of 10 microns or less, and is trying to prepare such an emitter cone on tens of thousands thru/or several 100,000 pieces, and one cathode substrate 115. In addition, in this field emission array, since distance between gate cathodes can be made submicron, it can be small between gate cathodes, or an electron can be emitted from the emitter cone group 112 by impressing the electrical potential difference VGE of several 10 volts.
[0005] By the way, the anode electrode 101 is formed in the anode substrate 104, and on it, the fluorescent substance dot pattern 102 carries out a laminating, and is formed. Then, it is the forward electrical potential difference VA to the anode electrode 101. If it is made to impress, the electron emitted from the emitter cone group 112 comes to be caught with the anode electrode 101, and in order that the electron caught may collide with the fluorescent substance dot pattern 102 by which the laminating is carried out on the anode electrode 101 and may excite this at this time, the fluorescent substance dot pattern 102 will come to emit light. This luminescence is observable through the anode substrate 104 of transparence.
[0006] Furthermore, in this display, the interior of the envelope constituted by the cathode substrate 115 and the anode substrate 104 is made into a high vacuum, and since the case where the cathode substrate 115 and the anode substrate 104 cannot hold predetermined spacing under the effect of atmospheric pressure arises, the insulating stanchion 103 is arranged between the cathode substrate 115 and the anode substrate 104. This insulating stanchion 103 is formed by insulators, such as glass, and is arranged for every predetermined spacing between the cathode substrate 115 and the anode substrate 104. [two or more]
[0007] And the upper limit of the insulating stanchion 103 is arranged so that the anode electrode 101 currently formed on the anode substrate 104 may be contacted, and the lower limit of the insulating stanchion 103 is arranged so that the gate line electrode 111 formed on the insulating layer 113 in the cathode substrate 115 may be contacted.
[0008] In addition, the matrix consists of two or more cathode line electrodes 111 of the shape of a stripe formed on the cathode substrate 115, and a gate line electrode 110 of the shape of a stripe formed so that it might intersect perpendicularly with this cathode line electrode 111, and it is scanned in the cathode scan section and the gate scan section which this matrix does not illustrate. Thereby, according to a picture signal, an electron is emitted from the emitter cone group 112, the corresponding fluorescent substance dot pattern 102 comes to emit light, and an image comes to be alternatively displayed on the anode substrate 104. In this case, the picture signal is impressed to the gate scan section, and when the scan of the 1 field is completed, the image of one sheet is displayed on the anode substrate 104.
[0009]
[Problem(s) to be Solved by the Invention] However, since the insulating stanchion was directly contacted by the gate line

electrode in the conventional display, when an insulating stanchion was pressurized by atmospheric pressure, the gate line electrode was transformed, the insulating layer prepared in the bottom of a gate line electrode was destroyed, and there was a trouble that there was a possibility that a gate line electrode and a cathode line electrode may short-circuit. Moreover, since the end of an insulating stanchion was directly contacted by the anode electrode and the other end was directly contacted by the gate line electrode, when the insulating stanchion was charged, there was a trouble that it could not isolate electrically, about surface leak in a lifting, the anode electrode which becomes empty, and a gate line electrode.

[0010] Then, this invention aims at offering the display which can isolate an anode electrode and a gate line electrode electrically while a gate line electrode and a cathode line electrode do not cause a short circuit, even if it prepares an insulating stanchion.

[0011]

[Means for Solving the Problem] In order to attain said purpose, the display of this invention The transparence anode substrate with which the anode electrode equipped with a fluorescent substance is prepared, So that the cathode substrate with which the gate electrode and cathode electrode for emitting the electron which excites said fluorescent substance are prepared at least, and said transparence anode substrate and said cathode substrate may hold predetermined spacing and may counter Have the insulating stanchion currently arranged two or more between said anode substrates and said cathode substrates, and it sets to said transparence anode substrate. While the notch is prepared in the edge part of said anode electrode near the contact location of said arranged insulating stanchion In said cathode substrate, the notch is prepared in the edge parts of said gate electrode near the contact location of said arranged insulating stanchion, and said cathode electrode.

[0012] Moreover, while said anode electrode is formed in said display with the transparent electrode formed on the stripe The fluorescent substance layer on the dot pattern which forms a pixel on it is formed. Furthermore, a stripe-like cathode electrode is formed on said cathode substrate. Subsequently, the resistive layer and the insulating layer are formed on it, on this insulating layer, the stripe-like gate electrode is formed so that it may intersect perpendicularly with said cathode electrode, and it is made to be arranged so that the end of said insulating stanchion may contact said insulating layer.

[0013]

[Function] Since according to this invention an insulating stanchion is arranged so that it may correspond to the notch prepared in the edge of an anode electrode, a cathode line electrode, and a gate line electrode, even if the insulating layer currently formed in the bottom of a gate line electrode is transformed, it is prevented that a gate line electrode and a cathode line electrode cause a short circuit. Moreover, since an insulating stanchion contacts an anode electrode and a gate line electrode and is not arranged, even if an insulating stanchion is charged, an anode electrode and a gate line electrode can be isolated electrically.

[0014]

[Example] Although the configuration of a cathode substrate is shown in drawing 2 and a sectional side elevation is shown for the configuration of the anode substrate in one example of the display of this invention in drawing 1 at drawing 3 , let the display of this example be the field emission mold display (FED) which makes a field emission cathode an electron source. Two or more anode electrodes of the shape of a stripe of A1 - A9 with which 1 is formed in the internal surface of the anode substrate 5 in these drawings, The fluorescent substance dot pattern by which 2 was formed as a dot-like pixel on the anode electrode 1, and 3 so that the anode substrate 5 and the cathode substrate 16 may be held at intervals of predetermined The insulating stanchion arranged between them, the notch by which 4 was formed in the edge of the anode electrode 1, and 5 are anode substrates which consist of clear glass.

[0015] Moreover, two or more gate line electrodes of the shape of a stripe of G1-G7 with which 10 is formed on the insulating layer 13, Two or more cathode line electrodes of the shape of a stripe of K1 - K5 with which 11 is formed on the internal surface of the cathode substrate 16, The conic emitter cone group currently formed on the resistive layer 14 as corresponded in 12 to the fluorescent substance dot pattern 2, The insulating layer by which 13 is formed on the resistive layer 14 except the part in which the emitter cone group 12 is formed, A resistive layer for 14 to impress the cathode electrical potential difference currently supplied to the cathode line electrode 11 to the emitter cone group 12, the notch by which 15 is formed in the edge of the cathode line electrode 11 and the gate line electrode 10, and 16 are glass cathode substrates.

[0016] Thus, in the constituted display, the envelope which opposite arrangement of the glass cathode substrate 16 with which the field emission array was formed, and the transparence glass anode substrate 5 is carried out with predetermined spacing, and holds the interior to a high vacuum is formed. Let further the field emission array formed in this cathode substrate 16 be the field emission array of the Spindt (Spindt) mold constituted with the cathode line electrode 11 of the shape of a stripe formed of the spatter etc., the resistive layer 14 formed on it, the emitter cone group 12 by which two or more formation was carried out on it, and the gate line electrode 10 formed near the tip of this emitter cone group 12. In addition, the laminating of the insulating layer 13 is carried out at a resistive layer 14 top, and the gate line electrode 10 is formed on this insulating layer 13.

[0017] Moreover, drawing 2 is drawing showing arrangement with the cathode line electrode 11 and the gate line electrode 10 which omitted the insulating layer 13 and the resistive layer 14, and penetrated and looked at the cathode substrate 16 from under the cathode substrate 16. As shown in this drawing, the emitter cone group 12 is formed in the **** field of the square shape currently formed in the cathode line electrode 11, and the pitch between the emitter cones of this emitter cone group 12 is created with the dimension of 10 microns or less. [many] A majority of such emitter cones are prepared in the **** field of the square shape formed in the cathode line electrode 11, and tens of thousands thru/or several 100,000 pieces are prepared on one cathode substrate 15.

[0018] In addition, in this field emission array, since the **** field of a square shape is established also in the gate line electrode 10 so that it may lap with the **** field of the square shape currently formed in the cathode line electrode 11 while being able to make distance between gate cathodes submicron, it can be small between gate line electrode 10 and the cathode line electrode 11, or an electron can be emitted from the emitter cone group 12 by impressing the electrical potential difference VGE of several 10 volts. By the way, as mentioned above, the laminating of the fluorescent substance dot pattern 2 is carried out on the anode electrode 1 formed in the anode substrate 5, and it is the forward electrical potential difference VA to the anode electrode 1. If it is made to impress The electron emitted from the corresponding emitter cone group 12 of a location It comes to be caught with the anode electrode 1, and in order that the electron caught may collide with the fluorescent substance dot pattern 2 by which the laminating is carried out on the anode electrode 1 and may excite this at this time, the fluorescent substance dot pattern 2 comes to emit light. This luminescence is observable through the anode substrate 5 of transparence.

[0019] Furthermore, since the interior of an envelope is made into a high vacuum and the case where an envelope is pressed by atmospheric pressure toward the inside and the cathode substrate 15 and the anode substrate 104 cannot hold predetermined spacing arises, as shown in drawing 3 , he arranges the insulating stanchion 3 between the cathode substrate 15 and the anode substrate 5, and is trying to hold predetermined spacing. This insulating stanchion 3 is formed by insulators, such as glass fiber, and two or more arrangement is carried out about 2mm of predetermined spacing, every [for example,], between the cathode substrate 15 and the anode substrate 5. And he is trying to contact the upper limit of the arranged insulating stanchion 3 directly on the anode substrate 104. In this case, as it is shown in the edge of the anode electrode 1 at drawing 1 so that the insulating stanchion 3 may not contact the anode electrode 1, they are the depth d1 and die length d2. The notch 4 is formed, and the insulating stanchion 3 is arranged so that it may be located in anode electrode A3 and the center of abbreviation of the notch 4 of A4 which adjoin as a part is expanded to this drawing and it is shown in it.

[0020] Thereby, even if the arrangement location of the insulating stanchion 3 shifts somewhat, it comes to be prevented that the insulating stanchion 3 contacts the anode electrode 1. Moreover, as shown in drawing 3 , the lower limit of this insulating stanchion 3 is arranged so that the insulating layer 13 in the cathode substrate 16 may be contacted. In this case, as shown in drawing 2 , the notch 15 is formed in the edge of the gate line electrode 10, and the insulating stanchion 3 is arranged so that it may be located in the center of abbreviation of the notch 15 of the gate line electrodes G6 and G7 which adjoin so that a part may be expanded to drawing 2 and it may be shown, so that the insulating stanchion 3 may not contact the gate line electrode 10.

[0021] Furthermore, the notch 17 is formed as shown also in the edge of the cathode line electrode 11 corresponding to the notch 15 of the gate line electrode 10 at drawing 2 . therefore, the notch 15 formed in the edge of the gate line electrode 10 and the notch 17 formed in the edge of the cathode line electrode 11 -- a part of drawing 2 -- as shown in an enlarged drawing, the notch of an abbreviation square comes to be formed. Since the gate line electrode 10 and the cathode line electrode 11 do not exist directly under the insulating stanchion 3 even if the insulating stanchion 3 is pressurized by atmospheric pressure and an insulating layer 13 deforms by this at the time of exhaust air of an envelope, between two electrodes 10 and 11 cannot contact and the short circuit accident between the gate line electrode 10 and the cathode line electrode 11 can be prevented.

[0022] Moreover, even if the insulating stanchion 3 is charged with the electron emitted from the emitter cone group 12, since the insulating stanchion 3 is not touched by the anode electrode 1 and the gate line electrode 10, it does not degrade the electric isolation between two electrodes 1 and 10. therefore, since it is lost that between the anode electrode 1 and the gate line electrode 10 leaks even if it makes high sharply the anode electrical potential difference impressed to the anode electrode 1, the brightness of the display screen can be boiled markedly and it can improve.

[0023] in addition, two or more cathode line electrodes 11 of the shape of a stripe formed on the cathode substrate 15 and this cathode line -- as shown in drawing 2 , the matrix consists of gate line electrodes 10 of the shape of a formed stripe, so that it may intersect perpendicularly with a conductor 11, and it is scanned in the cathode scan section and the gate scan section which this matrix does not illustrate. Thereby, according to a picture signal, an electron is emitted from the emitter cone group 12 one by one, ~~the corresponding fluorescent substance dot pattern 2 comes to emit light, and an image comes to be displayed on the anode~~ substrate 5. In this case, the picture signal is impressed to the gate scan section, and when the scan of the 1 field is completed, the image of one sheet is displayed on the anode substrate 5.

[0024] Moreover, the anode electrode 1 of the shape of a stripe shown in drawing 1 - drawing 3 is for this simplifying explanation, although 8 of A1-A8 and the gate line electrode 10 are shown for 11 as five of 7 of G1-G7, the cathode electrodeK1 - K5, and let each stripe-like electrode in fact be many [far] electrode numbers. By the way, the notch formed in the edge of the stripe-like anode electrode 1, the gate line electrode 10, and the cathode line electrode 11 is good also as the shape of a semicircle which it is not restricted to the notch of the shape of a rectangle as shown in said drawing 1 and drawing 2 , and is shown in drawing 4 (a), the 3 corniform shown in this drawing (b), the trapezoidal shape shown in this drawing (c), and reverse trapezoidal shape shown in this drawing (d).

[0025] Next, although the modification of the configuration by the side of the anode substrate in the display of one example of this invention is shown in drawing 5 , (a) is the front view of an anode substrate and (b) is the sectional side elevation of an anode substrate. The anode substrate 20 shown in this drawing is made into the product made from soda glass, and the PASSHI **-SHON film 24 of alkali ion is formed on that front face. This PASSHI **-SHON film 24 is SiO2. It is formed with the thin film.

[0026] On this PASSHI **-SHON film 24, it is TiO2. The thin film 25 is formed and the anode electrode 21 by which patterning was carried out is further formed on it. In this case, TiO2 which touches the anode electrode 21 by which patterning was carried out The thin film 25 is heat-treated so that it may become the colored coloring layer 25-1. Furthermore, the fluorescent substance layer 22 is formed so that the anode electrode 21 by which patterning was carried out may be covered. In addition, although patterning of the anode electrode 21 is performed by etching a rectangle-like part and removing as shown in this drawing (a), a majority of these rectangle-like parts are prepared in the anode electrode 21 in all directions. And the fluorescent substance layer 22 is excited with the electron irradiated by this rectangle-like part, and light is emitted. That is, an image comes to be displayed, a rectangle-like part being used as a pixel.

[0027] In this case, TiO2 Although the image displayed since the thin film 25 was transparence is observable through the anode substrate 20, since the pattern of the anode electrode 21 with the high reflection factor currently generally formed considering aluminum as an ingredient is covered with the coloring layer 25-1, reflection of the screen by the anode electrode 21 is prevented, and its contrast of an image is improving. Moreover, although two or more are arranged so that the insulating stanchion 23 may avoid a pixel, patterning also of the part of the anode electrode 21 with which the insulating stanchion 23 is arranged is carried out.

[0028] Next, the process which produces the configuration by the side of the anode substrate shown in drawing 5 is shown in drawing 6 . First, as shown in drawing 6 (A), the PASSHI **-SHON film 24 of alkali ion is formed in the anode substrate 20 made from soda glass, and an organic titanium compound 26 is further applied on it, and it dries. Subsequently, as it calcinates for about 10 minutes at the temperature of 500-600 degrees C and is shown in this drawing (B), it is TiO2 about the organic titanium compound film 26. It is made to change to a thin film 25. Furthermore, it is TiO2 as shown in this drawing (C). The aluminum thin film 27 is put with the sputtering method, vacuum deposition, etc. on a thin film 25. In this case, the aluminum thin film 25 shall be put so that it may become the thickness of about about 1.1 micrometers.
[0029] And a photoresist is applied to the front face of the aluminum thin film 25, and the aluminum thin film 25 of a garbage is dissolved by performing etching, after carrying out patterning of the photoresist to the shape of a pattern by performing exposure and a development, and as shown in this drawing (D), the anode electrode 21 is formed. Subsequently, except for the part which arranges the insulating stanchion 23 as shown in this drawing (E), patterning of the fluorescent substance layer 22 is carried out to the shape of a field on the anode electrode 21. And TiO2 which is in contact with the anode electrode 21 made from aluminum if an insulating stanchion is arranged and it is made to perform a baking process at the temperature of 450-550 degrees C A thin film 25 is colored and it considers as the coloring layer 25-1.
[0030] TiO2 which is in contact with the anode electrode 21 with heat treatment For a thin film 25 being colored, the anode electrode 21 of the product [time / of heat treatment] made from aluminum is TiO2. It oxidizes with a thin film 25, becomes an aluminum oxide, and, thereby, is TiO2. What a thin film 25 is returned and colored is presumed. In addition, SiO2 It changes to the soda glass with which the PASSHI **-SHON film 24 was formed, and you may make it use alkali free glass.
[0031] Moreover, SiO2 formed in the anode substrate 20 as it changes to the configuration by the side of the anode substrate shown in drawing 5 , and it is shown in drawing 7 , and makes the function of the PASSHI **-SHON film 24 and the coloring layer 25-1 serve a double purpose with TiO2 thin film 25 You may make it omit the PASSHI **-SHON film 24. TiO2 in this case Considering as 500-1500A is suitable for the thickness of a thin film 25. In addition, let the anode substrate 20 be a product made from soda glass. Furthermore, as shown in drawing 8 , as the cross-joint-like electrode 30 is further formed into a rectangle-like pattern, in the electrode pattern of the anode electrode 21, it may be made to ensure impression of the anode electrical potential difference to the fluorescent substance layer 22.
[0032] In the above explanation, although the case where this invention was applied to an electrolysis emission mold display was explained, this invention is applicable to the display with which it does not restrict to this and the insulating stanchion is prepared in the envelope, for example, a fluorescent indicator tube etc.
[0033]
[Effect of the Invention] Since an insulating stanchion is arranged by the notch prepared in the edge of an anode electrode, a cathode line electrode, and a gate line electrode as this invention was explained above, even if the insulating layer formed in the bottom of a gate line electrode is transformed, a gate line electrode and a cathode line electrode can prevent causing a short circuit. Moreover, since an insulating stanchion contacts an anode electrode and a gate line electrode and is not arranged, even if an insulating stanchion is charged, an anode electrode and a gate line electrode can be isolated electrically. for this reason, the anode electrical potential difference impressed to an anode electrode can be made high, and the brightness of a display image can be boiled markedly and it can improve.

[Translation done.]

* NOTICES *

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1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] The transparence anode substrate with which the anode electrode equipped with a fluorescent substance is prepared, So that the cathode substrate with which the gate electrode and cathode electrode for emitting the electron which excites said fluorescent substance are prepared at least, and said transparence anode substrate and said cathode substrate may hold predetermined spacing and may counter Have the insulating stanchion currently arranged two or more between said anode substrates and said cathode substrates, and it sets to said transparence anode substrate. While the notch is prepared in the edge part of said anode electrode near the contact location of said arranged insulating stanchion The display characterized by preparing the notch in the edge parts of said gate electrode near the contact location of said arranged insulating stanchion, and said cathode electrode in said cathode substrate.
[Claim 2] The display according to claim 1 characterized by forming the fluorescent substance layer on the dot pattern which forms a pixel on it while said anode electrode is formed with the transparent electrode formed on the stripe.
[Claim 3] Claim 1 characterized by being arranged so that a stripe-like cathode electrode may be formed on said cathode substrate, the resistive layer and the insulating layer may be formed subsequently to a it top, the stripe-like gate electrode may be formed on this insulating layer so that it may intersect perpendicularly with said cathode electrode, and the end of said insulating stanchion may contact said insulating layer, or a display given in two.

[Translation done.]